Office of Information Technology Services

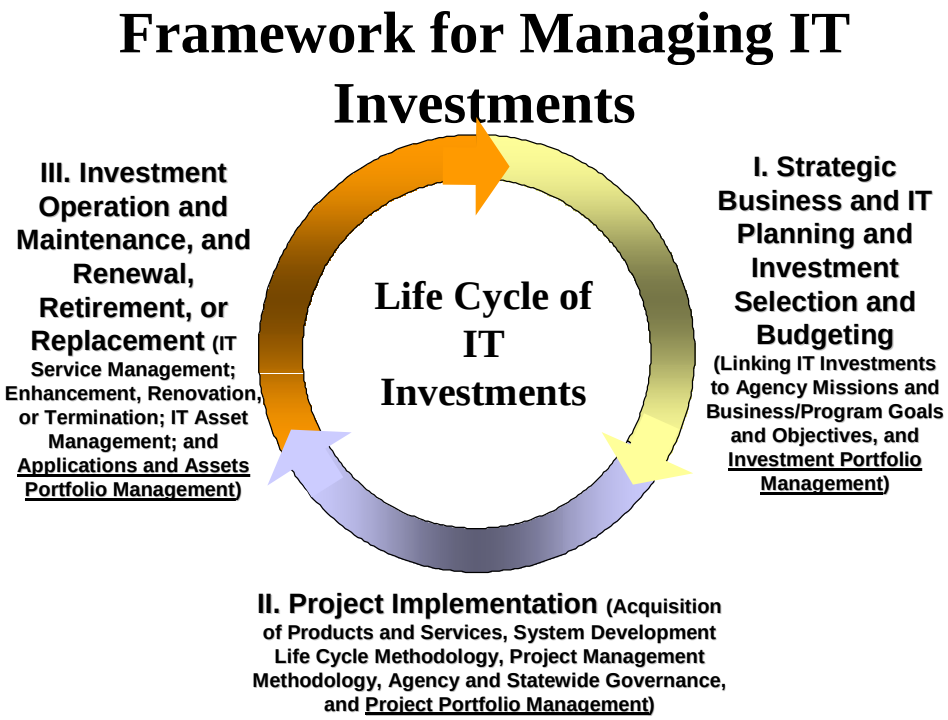
Project Portfolio Management Tool

North Carolina Framework for Managing IT Investments

July 2006

North Carolina Framework for Managing IT Investments

The process called the North Carolina Framework for Managing IT Investments, involves three major phases, and these are highlighted in the diagram below.



Purpose/Function(s) Supported

The Framework is part of an overall program for the improved management of technology, so that it is acquired, implemented, and employed more cost-effectively. The Framework outlines an approach for helping business/program and IT executives and managers: a) keep track of technology assets; b) plan goals for using technology to meet business/program requirements; c) determine when and how best to acquire and implement new technology; d) develop approaches and performance measures for maintaining and operating in-place technology; and e) decide when to discard, replace, or renovate duplicative, insecure, risky, or inefficient technology.

Origination

The Framework was developed from an extensive review of current literature and other references to provide a conceptual overview for the management of IT, with an emphasis on IT investments.

Summary of Features

The Framework offers two primary features. One, it presents a systemic and comprehensive view of the full IT investment life cycle. Therefore, the major components can be explained by their contribution to the coherent whole, as well as their individual and unique functions. Two, it gives an overview of the individual phases, with major objectives and activities of each.

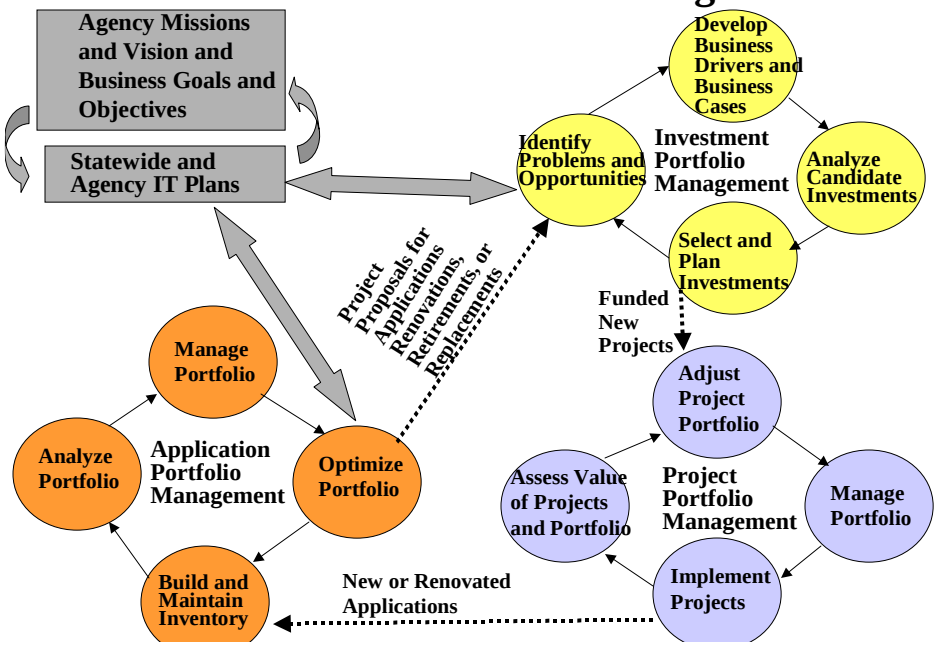
Benefits

The Framework provides a conceptual scheme for the selection, implementation, operation, and retirement/replacement of IT investments. More specifically, IT assets must be:

- Justified on the need to fill a gap in the ability of agencies and the state to meet strategic program goals or business objectives or modernize technical infrastructure to provide more and better services at less costs.
- Selected and funded so that they offer the least life-cycle costs of alternative approaches, meet risk-adjusted cost and schedule parameters, can be accomplished within personnel and fiscal resource limitations/availabilities, and provide desired and measurable benefits and value.
- Implemented in ways that demonstrate satisfactory progress toward achieving baseline cost, schedule, and performance/benefit goals.
- Operated proficiently to meet service level objectives, and maintenance and enhancements must be planned and conducted to optimize performance and cost-effectiveness over their useful lives.
- Reviewed continuously, and as appropriate, they must be replaced, retired, or renovated based on how close actual operating and maintenance costs are to desired budgets, whether performance and service levels meet operational goals, whether they continue to satisfy agency and user requirements, whether they present unacceptable security vulnerabilities, and whether they are at-risk for failure.

The graphic below illustrates the Framework concept from a portfolio management perspective.

Overview of IT Portfolio Management



The three phases of the Framework are summarized below.

I. Strategic Business and IT Planning and Investment Selection and Budgeting

This phase has two major activities of strategic business and IT planning and investment selection and budgeting, and each is highlighted in the below descriptions.

Strategic Business and IT Planning

The activity of strategic business and IT planning links the accomplishment of agency missions, duties, and responsibilities with the screening, selection, implementation, operation, and renovation or retirement of IT capital assets. Specifically, it involves the alignment of IT plans and priorities with agency strategies and business/program goals and objectives in order to leverage technology for: a) transforming business/program processes and practices to deliver more and better services at less costs, and b) contributing to the long term expanding needs of the state's citizens for public safety, societal health and welfare, educational opportunity, and economic prosperity.

More and more, IT organizations are providing measurable benefits to business/program operations and are becoming indispensable enablers for achieving broad-based governmental initiatives and agency strategic plans. The position of IT has evolved from that of an overhead entity to an organization providing critical enterprise investments and essential technical services.

Accordingly, agency executives and business/program managers are assuming key roles in developing IT plans and reviewing and selecting IT investments. IT managers must offer business/program leaders opportunities for using the power and capabilities of technology to achieve agency business/program goals and objectives and provide them with monetary, benefit, and risk information that goes along with making major financial and governmental decisions for implementing technology-enabled strategies. In addition, they must become service managers that plan, develop, and oversee the cost-effective implementation and operation of IT infrastructure and the delivery of efficient and reliable IT services for satisfying business/program needs.

When accomplished effectively, IT plans will assist in: a) aligning IT staffing and technical resources with agency missions, strategies, and initiatives; b) enabling and supporting innovative programs and streamlined business processes with appropriate and cost-effective technology; c) developing and implementing processes required to meet agency/program operational expectations; d) providing accountability by determining through performance measures how effectively and efficiently IT is responding to agency on-going needs and change-driven imperatives; and e) articulating the role and value of IT to the department/agency.

Project Evaluation, Justification, and Selection

The activity of project evaluation, justification, and selection employs planning and budgeting concepts, investment management practices, and portfolio management disciplines to create optimum agency and statewide portfolios of new initiatives, in-process projects, and operational assets. This activity is the linkage from the top strategic planning level to the tactical selection and implementation of technical infrastructure and applications for delivering services of public value. The objective is to select investments that agree with strategic plans, align with agency and state business and technical architectures, and conform to security policies and practices, while optimizing costs, benefits, and risks within available personnel, fiscal, and other finite resources. Ideally, funded and approved government technology investments should offer political and financial returns that are immediate, dramatic, and far-reaching.

The intent is to manage the portfolio mix of IT assets to optimize the value to the state and its citizens. It involves analyses and decisions that balance risks and costs with benefits and value to prioritize and sequence the development and utilization of IT assets, so that the right projects are funded and approved at the right time and at the right level of investment (in fiscal and personnel resources). It involves the development and use of an investment portfolio management process that includes:

- Evaluating and selecting investments that leverage modern proven technologies for enabling the utilization of innovative business processes to produce citizen-centered, performance-measured, and results-oriented outcomes.

- Making decisions on the best allocation of fiscal, human, and other resources to achieve strategic goals and initiatives within budget limits, personnel availabilities, and acceptable risk profiles.

- Leveraging opportunities for collaboration on investments that take advantage of common IT services, shared IT infrastructures, and/or uniform business/program processes to eliminate duplications, provide better citizen-relevant services, facilitate information sharing, and reduce costs.

- Ensuring selected investments follow statewide and agency technical architectures and security and privacy policies and standards to facilitate collaboration among governmental entities; provide for security of assets; ensure the privacy of individuals and confidentiality of data; and reduce risks of failure in implementation, or sub-optimal performance in operation.

- Making maximum use of commercial or government off-the-shelf technology (i.e., COTS or GOTS packages) and open technologies to minimize costs.

Each underway project must continue to justify its existence in terms of its a) alignment with current government initiatives, agency strategies and business/program goals and objectives, b) potential for delivering desired benefits and value within expected budgets and timetables and in conformance with its approved risk profile. Well-performing projects may be expedited or receive increased funding. Conversely, poorly performing ones may be cancelled, delayed, and/or have funds transferred to investments with more favorable prospects.

While one goal of this activity is to select the top individual investments, another is to select the optimum mix of investments that create the best agency and statewide portfolios. Thus, each proposed and in-process project is viewed not only by its own merits, but also by its value to a block of projects or to the portfolio as a whole. That is, IT investments are screened, categorized, and prioritized within a portfolio context of a grouping of projects or the whole portfolio itself, not only on a project-by-project basis. The intent is to maximize the aggregate value of IT investments from agency and statewide views within a desired composite risk profile.

In order to optimize the mix of investments, the selected composition of these portfolios should reflect a balance of benefits to citizens and the state; alignment with governmental initiatives and agency strategies; balance in risks; equality in allocation of resources among competing programs and priorities; and achievability within budgetary, personnel, and other constraints. Optimization is the process of considering trading-offs and reaching compromises to create the best achievable agency and statewide project portfolios within political, technological, and fiscal environments.

Moreover, by considering agency and statewide long-term strategies and plans, more impressive short-term gains may be outweighed by long-range and continuous improvements in productivities and services. Projects with little or no financial or governmental returns may be necessary to 'keep the business/program going' or provide improved management capabilities. Some projects may not offer significant benefits by themselves, but are essential prerequisites for succeeding or related endeavors that present favorable metrics and good value. Other projects maybe useful in minimizing risks for subsequent ones or offering better information for making major expenditure decisions in the future. Examples are planning projects to further identify, define, and quantify costs, benefits, and risks for implementation options and pilot efforts that may decrease the probability of failure for statewide implementations.

To accomplish this work, the following three prerequisites should be in place:

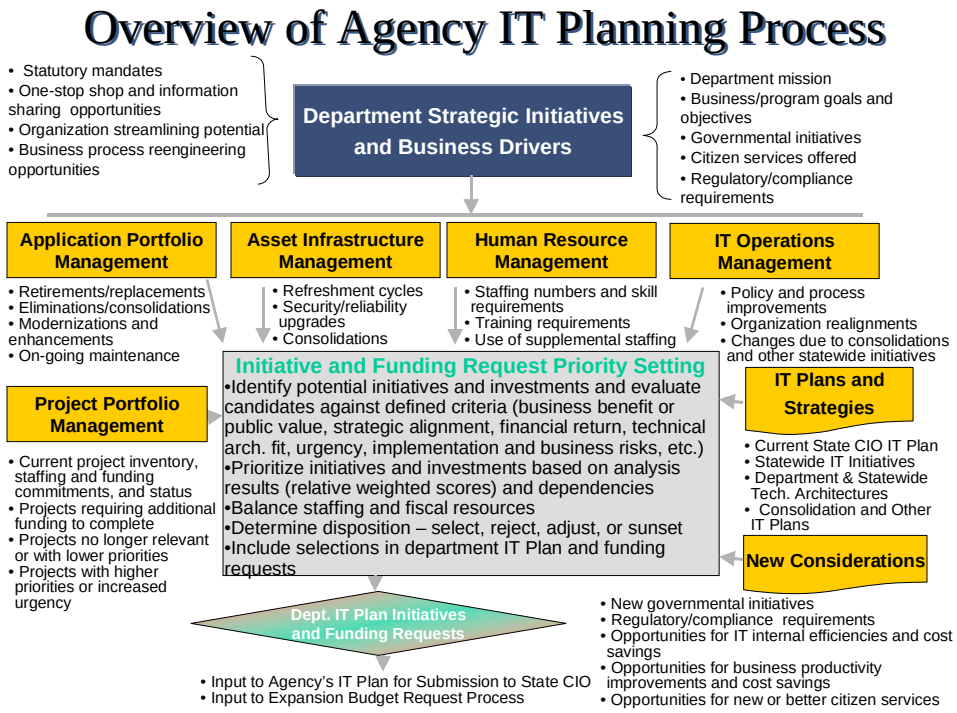
- Governance structure – organization, policies, rules, and processes (including decision criteria, forms/templates, etc.).
- Portfolio management disciplines.
- Analytical decision support tool(s).

Ideally, the following information must be available: 1) an accurate and complete inventory of current hardware, software, applications, and people assets; 2) a factual status/appraisal of physical assets, including which are underutilized or overworked or at risk of failure or redundant, which are diminishing in worth or benefits, and which offer the foundation for increasing value; 3) an evaluation of current projects, including present status, performance, resource requirements, and dependencies; and 4) an analysis of costs, governmental and financial returns, and risks of both current and proposed projects. The intent is to make investments that maximize returns for every dollar spent while balancing risks.

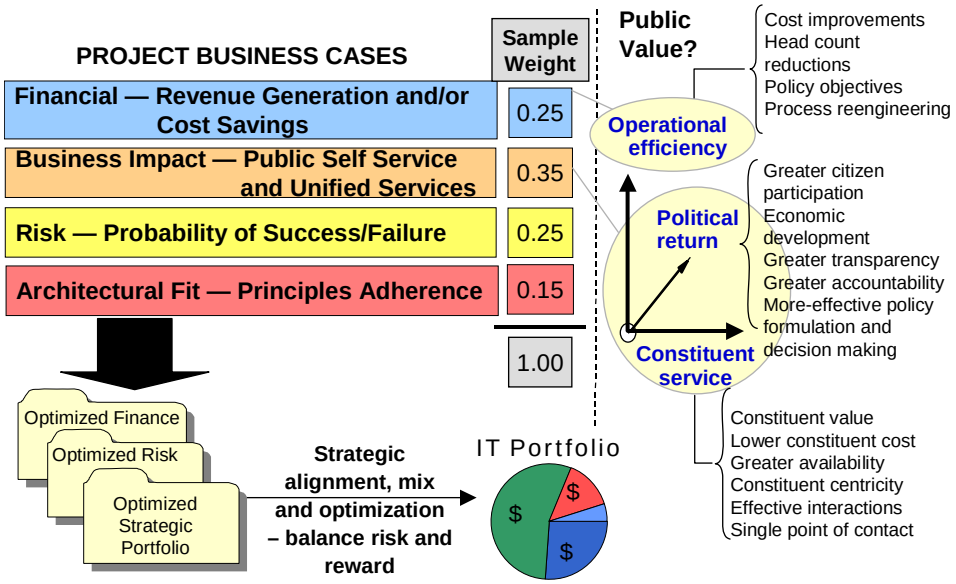
This activity involves the conceptualization of projects and the selection of investments, and it focuses on choosing the right investments based on

their impact on government performance (do the right things). The succeeding Phase II below involves the management of active projects, and it is targeted to ensuring these investments are properly acted upon (do things right). The juxtaposition of these two phases should ensure that the right things are done in the right ways for the right reasons.

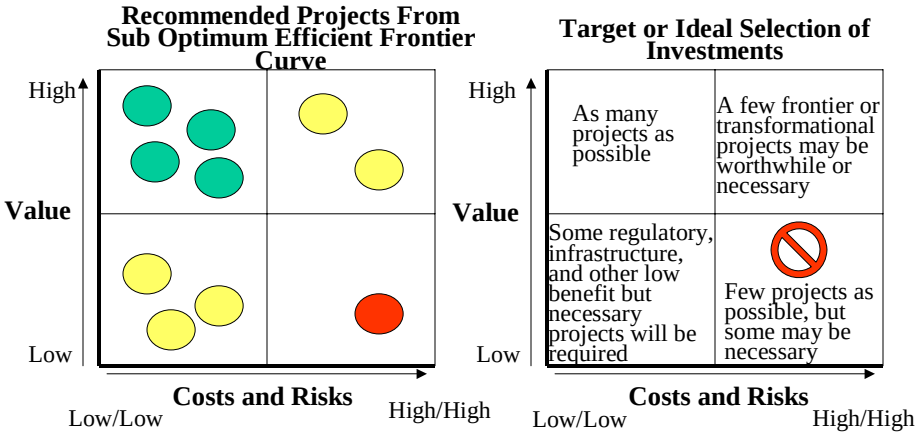
The three diagrams below highlight the major the major items described in the two above activities associated with Strategic Business and IT Planning and Investment Selection and Budgeting.



Consistent and Clear Criteria to Prioritize and Decide on Investments



Approved Portfolio Versus Target Portfolio



Realistically, the political, business, economic, and technical environments will not present situations or opportunities to achieve the optimum portfolio of investments (all projects can not be high-value/low-risks); however, a disciplined approach under an effective governance structure should produce a balanced portfolio that best aligns IT plans with governmental initiatives, agency priorities, and business goals and objectives; is achievable within fiscal, personnel, time, and infrastructure constraints; and offers the greatest benefits for costs incurred within acceptable levels of risks for the portfolio as a whole. There is an acceptable composition of higher-payoff/higher-risk and lower-payoff/lower-risk projects.

Regarding the above slide, once the criteria have been identified, each may be assigned weights reflecting the order of importance (greater importance/relevance to the agency equals higher weights). Each alternative is scored by criteria on a common scale (such as 1 to 10), the scores are multiplied by the weights, and the totals calculated. The resulting scores

should determine the priority sequence for the initiatives/investments. However, some initiatives or investments may advanced in the priority order due to other considerations, such as being a necessary prerequisite for other higher value ones.

II. Project Implementation

This and the preceding phase form a “closed loop” management process that directs investments based on strategic portfolio targets, keeps initiatives on track by measuring success around project approach, and holds senior executives accountable for achieving benefits and demonstrating value. The activities of these two phases should be tightly aligned to ensure that IT investments are in line with business strategies and goals, defined clearly in terms of accountability and success criteria, and monitored regularly to deliver expected results.

This phase involves the management of the implementation of assets to achieve intended cost, schedule, and benefit/value outcomes by:

- Eliminating process, organization, and technology change barriers, by developing and implementing business and organization transformation as part of the implementation work. This includes the simplifying or otherwise redesigning of work steps and the revamping of organizational structures and reporting relations to reduce costs and improve productivity of staff and effectiveness of business/programs.

- Identifying and managing risks to avoid cost overruns, scope creep, schedule delays, and assets that fail to perform as expected or not meet business/program objectives.

- Reducing project risks by avoiding or isolating custom-designed components, using components that can be fully tested or prototyped prior to full implementation, ensuring involvement and support of users in the design and testing of the asset, providing strong leadership and competent project management, and offering adequate training.

- Structuring long-term projects into useful segments with narrow scopes, brief durations, and defined deliverables.

- Making use of competition for purchases and employing performance-based acquisition management (contracting and contract management) that clearly defines cost, schedule, and performance goals and ties vendor payments to the successful achievement of these goals and state-accepted deliverables.

- Following statewide and agency technical architectures and security policies and standards. The objectives are to (a) maximize the usefulness of information; (b) minimize burdens on the public; (c) preserve the appropriate integrity, usability, and availability/accessibility of information; (d) provide for necessary interoperability and sharing of data with other applications/processes; (e) protect privacy of individuals, confidentiality of records, and security of assets; and (f) allow for scalability for serving more sites/users, extensibility for accommodating new technologies, openness for vendor independence and avoidance of vendor lock-ins, ease of use for efficient and effective performance, recoverability from disasters and continuity of business processes, and ease and economy of maintenance and operation over the lifetimes of assets.

- Instituting project management and performance reporting processes for project monitoring and status reporting that measure the progress of projects towards milestones in terms of cost, timeliness, and capability of the investments to meet specified requirements and quality and achieve business/program performance objectives.

- Establishing formal review/approval gates at appropriate checkpoints in the project life cycle for evaluating accomplishments to date and determining readiness for progressing to the next stage(s) of development.

- Conducting post-implementation reviews of acquisition processes and projects to validate estimated benefits and costs, identify effective management processes, determine if assets can be maintained and operated in a cost-effective manner, and document lessons learned.

In summary, this phase involves the efficient and cost-effective purchase and implementation of technical infrastructure and applications resources for delivering tactical goods and services to meet strategic agency plans and governmental initiatives and achieve business/program goals and objectives.

III. Operation and Maintenance and Asset Renewal, Retirement, or Replacement

This phase has two major activities of operation and maintenance and asset renewal, retirement, or replacement, and each is highlighted in the below descriptions.

Operation and Maintenance

The intent of this activity is to operate and maintain investments to minimize costs and maximize benefits over their useful lives, while providing secure, consistent, accessible, reliable, and cost-effective services. Issues to be addressed include accountability for running and maintaining assets, adoption of strict quality assurance practices, management of service level agreements (SLAs), and use of accounting procedures and charge back mechanisms.

Where they offer value and are cost-effective, SLAs may be used to establish performance measures, measure and monitor status, and initiate necessary corrective action. Prerequisites for establishing SLAs include: identify quality of service metrics, identify and budget administrative costs, develop terms and conditions and methodology for changing these, identify penalties for poor performance, implement appropriate management and measurement tools, and assign staff and develop management processes.

SLAs are key components in a service-oriented performance management process. Service-based performance management involves the capturing of customer service expectations and requirements, the activities for monitoring actual performance against these customer needs, and the identification of improvement priorities based on gaps. It includes the processes, tasks, people, and technologies required to deliver against customer expectations. These elements are measured and analyzed on a continuous basis and reengineered as needed to achieve performance goals. Performance scorecards report actual status versus financial expectations, customer satisfaction objectives, service-level agreements, and quality goals.

Many IT service organizations have adopted the IT Infrastructure Library (ITIL) framework is a process-centric approach for IT service management. ITIL consists of service management processes in two core areas – service support and service delivery. Service support is made up of service desk (a function, not a process) and incident, problem, configuration, change, and release management. Service delivery consists of the management areas of service level, financial, capacity, continuity and availability. The IT Service Management Forum (itSMF) is a not-for-profit organization set up for promoting and setting standards for best practices in IT service management, with chapters in many parts of the world, including the United Kingdom, Canada, and USA.

Asset Renewal, Retirement, or Replacement

The intent of this activity is to review and evaluate periodically the performance of operational assets to determine business and technical status and best approaches and optimal times for functionally enhancing, technically renovating, retiring, or replacing. Each IT asset has a useful life, and each requires an exit or replacement strategy engineered as carefully as an

implementation plan. Decisions regarding the levels of and timing for investments in ongoing maintenance and major enhancements should be made with the objective of optimizing costs and benefits over the useful lives of the assets. Assets should be retired or replaced when support is no longer possible, maintenance or enhancements are no longer cost-effective, or the risk of failure or the vulnerability to security compromises are no longer acceptable. Areas to consider include:

- Duplication of assets – Identifying multiple assets performing the same or similar functions, resulting in excessive and unnecessary costs.

- Costs - evaluating the cost-effectiveness of maintenance and efficiency of operations for the asset, and assessing the impact of the asset on the operational costs of the business/program processes it supports. This involves the identification of assets that are becoming too costly to maintain or operate and/or barriers to streamlined and economical business/program processes.

- Business/program needs (value to the agency and fit with business architecture) - determining how requirements might have changed, and whether the asset is continuing to fulfill ongoing and anticipated needs, delivering intended benefits to the state and its citizens, and capable of meeting current and future user requirements.

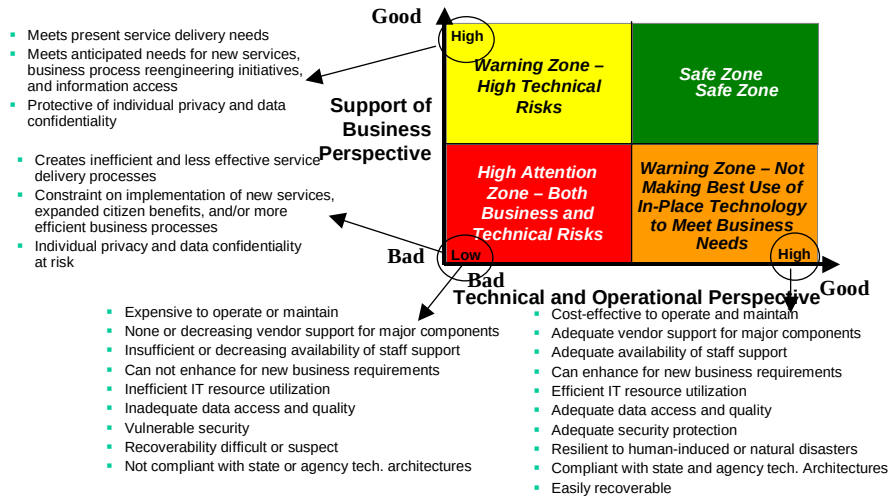
- Risks - Ascertaining acceptability of risks for failure of the asset or its obsolesce due to age or technology employed, dependence on hardware/software that is no longer supported by vendors, lack of available skills or documentation required to maintain or operate it, and/or propensity for security vulnerabilities. This involves the determination of the probability of failure or potential for unpredictable or unreliable performance of the asset and the resulting adverse financial, operational, and political repercussions.

Priorities and timeframes for replacements are based on the criticality of the asset (e.g., mission critical) and urgency (severity of the problem or magnitude of the benefit). Ideally, assets should be evaluated annually and management plans (called roadmaps) should be prepared and updated at the reviews. These prescribe the intentions and anticipated costs for renovating/enhancing/updating, eliminating or sun setting, retiring and replacing, or continuing regular operations and maintenance.

The four diagrams below highlight the processes described above.

Application Portfolio Management - Determining the Posture of Applications

Generic criteria are defined to assess applications from a business and technology perspective



- Meets present service delivery needs
- Meets anticipated needs for new services, business process reengineering initiatives, and information access
- Protective of individual privacy and data confidentiality

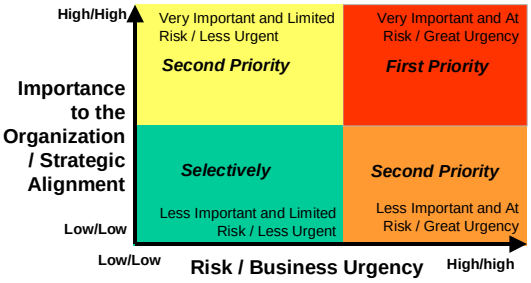
- Creates inefficient and less effective service delivery processes
- Constraint on implementation of new services, expanded citizen benefits, and/or more efficient business processes
- Individual privacy and data confidentiality at risk

- Expensive to operate or maintain
- None or decreasing vendor support for major components
- Insufficient or decreasing availability of staff support
- Can not enhance for new business requirements
- Inefficient IT resource utilization
- Inadequate data access and quality
- Vulnerable security
- Recoverability difficult or suspect
- Not compliant with state or agency tech. architectures

- Cost-effective to operate and maintain
- Adequate vendor support for major components
- Adequate availability of staff support
- Can enhance for new business requirements
- Efficient IT resource utilization
- Adequate data access and quality
- Adequate security protection
- Resilient to human-induced or natural disasters
- Compliant with state and agency tech. Architectures
- Easily recoverable

Application Portfolio Management - Investment Selection and Prioritization

Prioritization and timeframe for action are driven by overall importance to the organization/strategic alignment of application, business urgency for remediation, and risks.



"Very Important and At Risk/Great Urgency" are highest priority were level of risks and degree of urgency drive remediation activities

"Very Important and Limited Risk/Less Urgent" applications are second priority compared to above due to less strategic importance and/or mission criticality

"Less Important and At Risk/Great Urgency" applications are also second priority for remediation, but may deserve slightly higher consideration due to high risk and more pressing business urgency

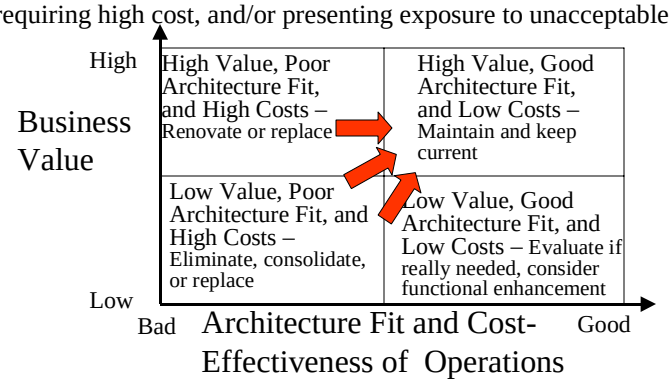
"Less Important and Limited Risk/Less Urgent" are lowest priority

In addition prioritization is driven by:

- **Specific business initiatives, programs, and/or funding streams available**
- **Overall risk issues, interrelationships between applications, and the general need for modernization of legacy systems**

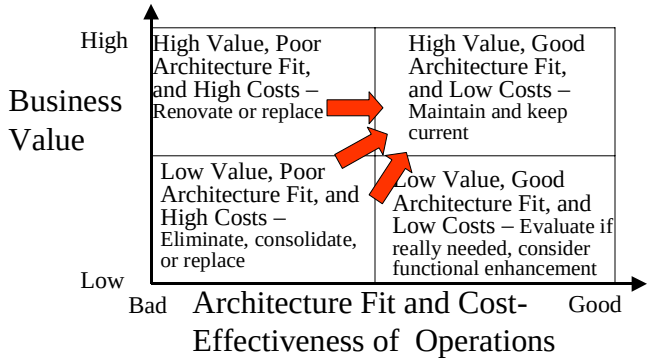
Application Rationalization

Rationalization implies the use of logical processes, rational thought, and agreed upon principles to weed out unwanted items and effect change. The rationalization of applications portfolios involves a step-by-step process conducted on an application-by-application basis with agreed upon methodologies and criteria and within a decision-making governance model to: 1) reduce the number of applications by the consolidation of those performing similar functions and the elimination those of low value and high cost, and 2) remodel or replace those providing value but not fitting technical architectures, requiring high cost, and/or presenting exposure to unacceptable risks.



Portfolio Management Strategy

The management of applications portfolios uses similar strategies and disciplines as those employed by financial managers. Portfolios are optimized by determining which applications receive current, lower, or increased levels of funding and which ones are targeted for renovation, consolidation, elimination, or replacement. Over time, the applications portfolios as a whole should reflect the greatest business value and closest architectural fit with the lowest costs and risks.



Summary of the three-phased framework for managing IT investments

New investments in IT assets must be justified on the need to fill a gap in the ability of agencies and the state to meet strategic program goals or business objectives or modernize technical infrastructure to provide more and better

services at less costs. These investments must offer the least life-cycle costs of alternative approaches, meet risk-adjusted cost and schedule parameters, and provide desired and measurable benefits and value. Implementation projects must demonstrate satisfactory progress toward achieving baseline cost, schedule, and performance/benefit goals. In-place assets must be operated proficiently, and maintenance and enhancements must be planned and conducted to optimize performance and cost-effectiveness over their useful lives. Operational assets must be reviewed continuously, and as appropriate, they must be evaluated on how close actual annual operating and maintenance costs are to the original life-cycle budgets, whether the level or quality of performance/capability meets original goals, whether they continue to satisfy agency and user requirements, whether they present unacceptable security vulnerabilities, and whether they are at-risk for failure. Replacements, retirements, and major renovations must be planned and performed based on critical analyses of technical and business status, approach for remediation, and urgency and timeframe for action.

The diagram below highlights the value of an asset that is lost if the three phases of the life cycle of the asset are not managed properly.